

mations" a "Metamorphic System" underlying the Laurentian, and an "Azoic Cycle," preceding the Palæozoic. Now there may be a Metamorphic System of older date than the Laurentian rocks, and strata deposited during "Azoic" times may also exist; but at present we have no knowledge either of the one or the other. Murchison, we thought, had settled once and for ever that the crystalline schists of the Scottish Highlands were of post-cambrian age.

J. G.

LETTERS TO THE EDITOR

[The Editor does not hold himself responsible for opinions expressed by his correspondents. No notice is taken of anonymous communications.]

The National Herbarium

PERMIT me, in your columns, to give shortly the grounds upon which I made the statement that no herbarium of any kind existed at Kew Gardens during the time of the Aitons, but that the Banksian Herbarium was often, and for a long time systematically, used for naming the Kew plants (NATURE, Oct. 3, 1872, p. 450), which statement is thus dealt with by Dr. Hooker (NATURE, Oct. 24, 1872, p. 516):—"Nor was the naming of the Kew plants carried out in London, as is supposed. There was a large herbarium in constant use at the Royal Gardens at the very period alluded to, the breaking up of which, when it was proposed to give up the Gardens, necessitated the formation of another."

Instead of my statement being a supposition, it was based on the following data:—1. The lists of the plants sent up from Kew Gardens to be named by Solander when Curator of the Banksian Herbarium, which were duly entered in the "garden book," still preserved in the Botanical Department here. 2. The continuance of this practice to a recent date, as evidenced by the following article in the engagement between Mr. Brown (Solander's successor in the Banksian Herbarium) and the trustees of the British Museum when he became keeper of this department in June 1872, "that Mr. Brown have full liberty to assist the Superintendent of the Royal Botanical Gardens at Kew, in like manner as during the lifetime of Sir Joseph Banks." 3. The specific statements in several official reports of the late Sir W. J. Hooker, such as this from one dated 31st December, 1854:—"Till 1853 our garden was utterly destitute of the two former appendages," viz., an herbarium and library.

I was surprised to read Dr. Hooker's declaration that his evidence is "unequivocally opposed" to the transfer of the collection of dead plants from the British Museum to Kew. In this case I have completely misunderstood his position in the repeated attempts that have been made to destroy the scientific position of the National Herbarium at the British Museum. In 1853, when the trustees of the Museum were induced to inquire into the necessity for the existence of the herbarium in London, they examined Dr. Hooker among other witnesses, and in their finding they say, "Sir W. Hooker, Dr. J. Hooker, and Dr. Lindley have given reasons in favour of the removal of the collections from the British Museum to Kew, with the view of rendering that establishment more complete." Other testimony, however, had more weight, and so they were "unanimously of opinion that it is not desirable to recommend the translation of the botanical collection from the British Museum to Kew." (Return, House of Commons, 1859, No. 126, p. 12.) Ten years after, in the memorial presented through the Board of Works to the trustees, Dr. Hooker proposed that a "Reference Herbarium," consisting of the "British Museum Herbarium, minus the specimens required for Kew" should be kept at the Museum for the use of "botanists, geologists, amateurs and others resident in London, or passing through it, who may want information which it would not be worth their while going to Kew to procure." And more recently, in his evidence before the Science Commissioners, Dr. Hooker repeats this proposal with somewhat more of detail. The great scientific working herbarium to which all botanists should come should be at Kew (Q. 6,683). To secure this, "the two herbaria should be arranged under one head" (Q. 6,685). "I could bring the collection under one system" (Q. 6,730). It would be the duty of the first herbarium in the

country (i.e. Kew) to supply the British Museum (Q. 6,745). The specimens, "on their arrival at the British Museum, could be put into their places by the officers there, the operation being as simple as that of putting books on a shelf," and in future "a subordinate could intercalate the additions" (Q. 6,732).

No doubt these proposals (excluding that made in 1858, on the death of Mr. Brown, and before the appointment of Mr. Bennett), contemplate the maintenance of a collection of dead plants in London. But a collection from which "all specimens of interest only to the scientific botanist have been removed to Kew" (NATURE, vol. iii. p. 401), and consisting only of the worthless duplicates of the two amalgamated herbaria, would be utterly useless for scientific purposes, and its maintenance would unquestionably be a waste of public money.

I will only add, that there is certainly nothing to prevent Dr. Hooker "recruiting" the British Museum Herbarium from that at Kew to any extent, at once, and without the intervention of a Royal Commission. It is quite certain that the trustees and my predecessors, like myself, would have welcomed sets of the numerous collections, made at the expense of the British Government, which have been distributed from Kew to "America, Paris, Austria, Prussia, Hanover, Holland," &c., but none of which have ever been sent to the National Herbarium at the British Museum!

W. CARRUTHERS

British Museum, Dec. 2

THERE is no inconsistency between Sir W. Hooker's statement, quoted by Mr. Carruthers, that "till 1853 our garden was utterly destitute" of an herbarium and library, and mine that in the Aitons' time there was a large herbarium here, kept up for naming the garden collections. Sir W. Hooker of course referred to the period during which the gardens had been public property. The herbarium in question was broken up when Kew ceased to be a private establishment. The words quoted by Mr. Carruthers ought hardly in fairness to be detached from the context. Sir W. Hooker's meaning was, of course, that the gardens, as a public department, possessed, till 1853, no official herbarium or library. He goes on to speak of his own private ones, by means of which the work of the garden had been carried on ever since he became director, and which, having at his death been purchased by the Government, form, with those presented by Mr. Bentham and others, the foundation of the present collections.

It is necessary to mention this, as otherwise Mr. Carruthers' quotation might lead anyone unacquainted with the facts to suppose that the work of Kew Gardens up to 1853 had been conducted without any herbarium or library whatever.

Mr. Carruthers is mistaken in implying that I ever suggested the supplying the British Museum with "worthless duplicates" from Kew; and equally so in stating that "none" of the collections distributed here have ever been sent to the British Museum. Such an assertion is no encouragement to send more. Nor does the fact that no return of any kind has ever been made by the British Museum for some thousands of specimens that have been sent to it from Kew, offer much inducement to continue such gifts. It is the clear duty of this, as of other similar establishments, to distribute its duplicates to such institutions as exert themselves to make a suitable return. This is the case with the Herbaria of America, Russia, Prussia, Holland, &c., and, in fact, with all kindred establishments with which Kew corresponds. It is the acquisition by this means of authenticated specimens from almost every seat of botanical research, which more especially gives to the National Herbarium of Kew Gardens the incomparable position it now holds.

JOS. D. HOOKER

Royal Gardens, Kew, Dec. 3

The Meteoric Shower

WHILE the observations of the recent meteoric shower continue to attract general attention, the following notes of some descriptions of the display that have reached me, which will contribute useful results for comparison with published accounts of the phenomenon that have already appeared, will, perhaps, be interesting to your readers:—

On the nights immediately preceding that of the star-shower the sky was at some places unclouded, and observations of meteors were recorded. The large meteor described in a recent

number of NATURE as having been seen by Mr. Denning at Bristol on the evening of the 23rd ult., as well as a single other shooting star noted during a watch of the sky whenever it was clear by the same observer on that evening, seem, from their apparent courses, to have been both possibly directed from the now well-known radiant point of the meteors of Biela's comet, but only a small number of shooting stars appears to have been visible on that night. During a watch for ten minutes, kept at four different times between half-past 7 and half-past 9 P.M. on the following evening, near Regent's Park, in London, Mr. H. W. Jackson observed, in each watch, a shooting star as bright as a first-magnitude star directed in each case from the recently determined radiant point; while, with an equally uncloudy sky, on the following evening of the 25th, three small meteors from the same radiant point, and two brighter ones from other directions, were seen by Mr. Denning at Bristol between 8 and 11 P.M. in two intervals of a watch for half an hour. A small meteor of the same stream was recorded by Mr. Denning on the 26th, but their numbers on this, as on the previous nights, were evidently inconsiderable, a clear view of the sky on the night of the 26th, between 11 h. 20m. and 12 h. 40m., affording Mr. Jackson, at Tooting, no observation of a single meteor. The time of first approach and commencement of the bright star-shower seen on the evening of the 27th ult. must therefore have been later than shortly before 1 o'clock on the previous morning. A completely overcast state of the sky after midnight on the night of the shower appears to have prevented observations of its close, and probably of its complete extinction on that night, after the greatly-diminished intensity which it had then attained; but a correspondent in London informs me that, in spite of the densely overcast state of the sky, which prevented any view of the shower from being obtained in the metropolis, an exceedingly bright meteor was seen to flash like lightning through the clouds at about 4 o'clock, A.M., on the 28th. On the evening of the 28th Mr. Greg watched for shooting stars, and for any remnants of the star-shower of the previous evening which might be visible, at Buntingford, in Hertfordshire; but although the sky was quite clear he failed to see any meteors. A strict watch for outlying meteors of the shower was also kept by two observers at Hawkhurst, in Kent, on the evening of the 28th, where the sky was quite cloudless between 9 h. and 11 h. 15m. P.M., but without success, only four shooting stars of ordinary character being visible during more than two hours of their simultaneous watch. An interval of about forty-four hours is thus clearly determined in which the first indications of the star-shower must have arisen, reaching the maximum of its intensity towards the middle of the period, and disappearing so completely before its termination as to leave the whole expanse of the sky almost as perfectly free from shooting stars as it was before its commencement.

In addition to the early appearance of the shower recorded in NATURE of the 5th inst. as having been seen near Dublin, I have received the following communications from observers relating to its early visibility and abundance. At Brancepeth, near Durham, Mr. Joseph Lawson first began to count the meteors at 5 o'clock, and continued to enumerate them until, towards 7 o'clock, their constantly increasing frequency obliged him to desist. During the last half hour of his estimation the rate of their appearance was about ten per minute, while a total number of 1,000 meteors was counted between 5 and 7 o'clock. The rate of their appearance in the first was thus little less than that of their appearance in the latter portion of his watch. Mr. S. J. Miller, at Wisbeach, first noticed the abundance of shooting stars at 5 h. 40m., and counted in three minutes twenty meteors, or about six or seven per minute. Soon after this, at about 6 o'clock, their number was ten or twelve per minute. During their appearance before 6 o'clock, Mr. Wood, at Birmingham, considered them to be falling from 5 h. 45m. when he first observed them, at a rate of about fifteen per minute, while the result of his enumeration between 6 h. and 7 h. was at least 600 meteors, and in occasional intervals between 6 h. and 7 h. 15m., when the sky became gradually overcast, the average rate of appearance was found to be increasing nearly uniformly from 8 to 10 per minute, showing that the intensity of the display before 6 o'clock was little inferior to the maximum which it appears afterwards to have gradually attained. At York the first attempt to estimate their numbers was made by Mr. T. H. Waller, at 5.30 o'clock, when the meteors were found to be appearing at the rate of 12 or 15 per minute. At 6 o'clock their numbers had increased to about

20, and at 7 o'clock to about 30 or 40 per minute for one observer. At 8 o'clock the best determination of their numbers was however obtained by two of Mr. Waller's scholars, who, standing back to back, counted 79 meteors in 1m. 15s. or 31 meteors per minute for each observer. The principal maxima of the shower at about 6 h. 30m., and 8 h. 15m. P.M., as mostly clearly shown by the continuous observations of Mr. Lowe at Highfield House, and by Prof. Grant, who was assisted in his observations at the Glasgow Observatory by Prof. G. Forbes, are also generally indicated by the observations which I have received, and the gradual diminution of the shower after 9 o'clock was observed at Newcastle-upon-Tyne as well as by some of the observers who combined in their watch for its appearance for the British Association. The frequency of the meteors after 9 o'clock was regarded by Mr. Wood as not more than a quarter of what it was at about 6 o'clock, when they were first seen, yet these numbers continued for some time to be considerable and quite unusual. Near Rothbury, in Northumberland, repeated estimations of their abundance were made by Mr. G. A. Lebour in different parts of the sky, and at different times between the hours of 7 and 10 o'clock, with the following results:—

From 7 ^h 20 ^m to 7 ^h 28 ^m	100 meteors falling perpendicularly in the west (the east cloudy).
7 35 7 40	100 meteors falling vertically in the east (the west cloudy).
7 45 7 48	100
9 0 9 15	Meteors too numerous to count at 9 h., falling in showers at 9 h. 15 m., especially in the north; one bright red with beautiful red streak, which lasted more than 10 seconds.
10 0	Meteors still falling, but in smaller numbers.

In 20 minutes after 10 o'clock 35 meteors were seen by one observer in a clear part of the sky, which scarcely exceeded a quarter of the sky. In 10 minutes after 11 o'clock ten meteors only were counted in the same space, and in 20 minutes after 12 o'clock 9 meteors only could be seen. The rate of decrease of the shower from shortly before 10 o'clock until after midnight was thus apparently more rapid, and the decline of its intensity appears to have been considerably more complete than the first brightness and progress of its gradual increase may be concluded to have been during the earliest hours of its observation.

Newcastle-upon-Tyne, Dec. 7

A. S. HERSCHEL

The De Novo Production of Living Things

WILL you allow me to ask Dr. Bastian to state in your columns, in reply to this note, the specific gravity of the turnip infusion, to which a "fragment" of cheese has been added, and which, he states, has rarely failed to give him positive results in his endeavours to obtain evidence of the *de novo* production of living things from dead matter. If Dr. Bastian should be unable to give the specific gravity of the infusion, perhaps he will be so good as to state accurately the weights of water, turnip, and cheese employed. I am, of course, acquainted with the directions he has already given, but wish to avoid any objection from him or others on the score of improper preparation of the infusion to results which I may obtain and publish.

E. RAY LANKESTER

Exeter College, Oxford, Dec. 7

The Birth of Chemistry

YOUR correspondent, "A. H.," in alluding to my mention of the *Insula Cassiterides*, inquires whether the name was derived from a Sanskrit source. The word *kaṣṭhīrepa* is used both by Homer and Hesiod, and it is possible that it may have been borrowed from the Sanskrit *kaṣṭhira*, and that tin was first procured from India. The Sanskrit word for tin—*kaṣṭhira*—is clearly related to the verb *kāś*, to shine. It is strange that the Arabic word for tin is *kaṣṭir*, closely resembling the Sanskrit, although there is no family relationship between the languages. Possibly the Phœnicians first procured tin from India, and gave it a name resembling its native name *kaṣṭhira*; then the Greeks converted the Phœnician word into *kaṣṭhīrepa*, the Romans borrowed the word from the Greeks, and the fact of the scarce